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## Patent Claims

1. A process for the low-wear micromachining of  
5 workpieces made from metallic materials or metal  
alloys, in particular steel, in which a workpiece (1)  
is micromachined using at least one machining apparatus  
(5) that has a diamond tool (6), in particular an  
ultraprecision turning, milling or grinding machine,  
10 characterized in that prior to the machining the  
workpiece (1), in a first step, is subjected to a  
thermochemical surface layer treatment, and in that in  
a second step the thermochemically treated surface zone  
(2) of the workpiece (1) is machined using the  
15 machining apparatus (5).

2. The process as claimed in claim 1, characterized  
in that the workpiece (1) consists of a metal from  
transition group IV - VIII, in particular iron, nickel,  
20 chromium, vanadium, molybdenum, titanium, tungsten or  
cobalt, or an alloy based on these metals produced in  
particular by sintering.

3. The process as claimed in claim 1, characterized  
25 in that the thermochemical surface treatment introduces  
at least boron, nitrogen, carbon, oxygen, phosphorus,  
sulfur into the workpiece surface zone (2).

4. The process as claimed in claim 1, characterized  
30 in that the thermochemical surface treatment is  
nitriding, nitrocarburizing, carbonitriding,  
boronizing, carburizing or oxidizing or a combination  
of these processes.

35 5. The process as claimed in claim 1, characterized  
in that the thermochemical surface zone treatment  
process is gas nitriding, gas carbonitriding, bath  
nitriding, plasma nitriding or laser nitriding.

6. The process as claimed in claim 1, characterized  
in that the depth of cuts introduced into the workpiece  
(1) using the diamond tool (6) is less than the  
5 thickness of the thermochemically treated surface zone  
(2).

7. A workpiece made from a metal or a metal alloy, in  
particular steel, with a surface which has been  
10 machined by micromachining, characterized in that the  
workpiece (1) has a surface zone (2) formed by  
thermochemical surface treatment, such as nitriding,  
nitrocarburizing, carbonitriding, boronizing or the  
like.

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8. The workpiece as claimed in claim 7, characterized  
in that the workpiece (1) is a molding tool for optical  
mold making, in particular for the production of  
aspheric optics, optical components with free-form  
20 surfaces and prism arrays made from plastic or glass.

9. The workpiece as claimed in claim 7, characterized  
in that the workpiece (1) is a precision mechanical  
component, in particular a bearing shell for air  
25 bearings, a valve seat for highly loaded hydraulic  
actuators, a highly loaded precision guide element, a  
bearing shell for high-precision ball bearings or a  
corrosion-resistant metal mirror.

30 10. The workpiece as claimed in claim 7, characterized  
in that the workpiece (1) consists of iron, nickel,  
chromium, vanadium, molybdenum, titanium, tungsten,  
cobalt, or an alloy based on these metals produced in  
particular by sintering.

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11. The workpiece as claimed in claim 7, characterized  
in that the workpiece (1) consists of high-alloy steel.